Cotter Corporation
General Office

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61

July 8, 1996

Steven E. Kinser
Remedial Project Manager
Missouri/Kansas Remedial Branch,
Superfund Division
United States Environmental Protection
Agency
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

David A. Hoefer, Esq.
Assistant Regional Counsel
Office of Regional Counsel
United States Environmental Protection
Agency
726 Minnesota Avenue
Kansas City, Kansas 66101

Re: Supplement to Cotter Corporation's Section 104(e) Response Regarding Westlake Landfill

Dear Messrs. Kinser and Hoefer:

Cotter Corporation ("Cotter") has recently identified the following additional documents that may be responsive to EPA's Information Requests and therefore wishes to supplement its response:

1. An August 11, 1970 Site Visit Report of the Latty Avenue property written by David L. Broonan of Rychman, Edgerly, Tomlinson and Associates ("RETA"), numbered WLA 2100-2102. According to information from RETA, AEC was provided a copy of this report during a November 17, 1970 inspection of the Latty Avenue Property. This document may be responsive to Request No. 8.5 ("Results of any sample analyses performed on these wastes prior to disposal").

2. A handwritten note, numbered WLA 2103, which contains a reference to 2500 tons of leached barium sulfate at Latty Avenue, which is the same quantity referenced in Document No. WLA 0077 previously provided, as well as Cotter's previous response to Request No. 8.2. This document may be responsive to Request No. 8.2 ("Quantity").

3. A December 21, 1971 letter from R.J. Smokowski, Contract Administrator of Nuclear Fuel Services, Inc., to Edward J. McGrath, attorney for Cotter, numbered WLA 2152-2153, referring to "ten thousand tons of mill tailings primarily barium sulfate that is contaminated with radium" at Latty Avenue. This document may be responsive to Request No. 8.2 ("Quantity").

4. A December 6, 1972 letter from David P. Marcott, Executive Vice President of Cotter, to Dr. Frank Pittman, Director, Division of Waste Management and Transportation, AEC, numbered WLA 2154-2155. This letter refers to an attached engineering report by RETA. The May 1972 Proposal for Decontamination of Latty Avenue Storage Site, written by RETA, which is included in this supplement, numbered WLA 2104-2151 appears to be a draft or final copy of the report attached to the letter to AEC. The proposal refers to 8700 tons of leached barium sulfate, containing about 7 tons of uranium, which are the amounts referred to in AEC and NRC reports, and contains a cubic yard estimate of 2800 cubic yards of leached barium sulfate. This document may be responsive to Request No. 8.2 ("Quantity").

Please call me if you have any questions about this supplement.

Very truly yours,

Rich D. Ziegler
Executive Vice President
and General Manager

RDZ\dd
RDZ\321.RDZ

Attachments
cc: Jim Gunn (w/att.)
Mike Hockley (w/att.)
Jim Wagoner (w/att.)

SITE VISIT REPORT
Cotter Corporation
RETA-780

August 11th, 1970
Page 1

cc: H. D. Tomlinson
E. Edgerley, Jr.
P. K. Feeney
Mr. Charles Brokaw

On August 11th, 1970, David Brooman of Ryckman, Edgerley, Tomlinson and Associates made a site visit and initial radiation survey at the Latty Avenue Raffinate Storage Site. Mr. Brooman made contact with Mr. Charles Brokaw of B & K Construction Company who will be acting as Superintendent during the raffinate drying operation.

Mr. Brooman walked the fence line surrounding the property and measured boundry line radiation levels where the fence was accessible. In many areas, especially along the south end of the property, the fence was not accessible due to heavy weed growth. Figure 1 summarizes radiation levels measured along the fence line. Also noted on this drawing are locations where the fence is in poor condition and in need of repair. In general, the radiation levels measured were within the allowable limitations set by the AEC (0.6 MR/hrs at 18 inches from the fence line). Only that location opposite the Leached Barium Sulfate pile at the southwest corner of the property recorded levels approaching the AEC limitation.

Radiation levels were also monitored inside the fence in the various working areas where workers could be expected to be exposed to radiation for 8 hours a day. Only two locations were noted where an 8 hour exposure would yield dosages in excess of the AEC limitations (2.0 MR/hrs). These locations are the Leached Barium Sulfate pile and the Yellow Cake Drum Storage Area located between the equipment storage building (Building C) and the Drying Building (Building D). Worker exposure time should be limited in these areas.

Samples were obtained of the water and bottom silt in the various drainage channels which surround the Latty Avenue property. Two samples were obtained from the creek which runs around the south property line, one sample upstream from the property and the second sample immediately downstream from the property. Two other samples were obtained where this small creek joins into Coldwater Creek approximately 500 yards west of the property. Again, samples were obtained upstream and downstream from this confluence. A third set of samples were obtained from the drainage ditch which runs along the north property line. The first sample was obtained east of the property in front of the adjoining plant. The second sample was obtained downstream from the property approximately 200 yards west of the property line. These samples are to be analyzed for gross radiation activity both in the filtered water and in the solid silt material.

Upon returning to RETA's office Mr. Brooman had a telephone conversation with Mr. Brokaw concerning the results of the survey. The following recommendations were made by Mr. Brooman:

1. Have the laborers clean the weeds away from the fence line and repair the fence where necessary;

2. Limit the laborers activities around the Leached Barium Sulfate pile and the Yellow Cake Crum Storage area to a maximum of 1 to 2 hours per day;

3. If possible do not attempt to dry yellow cake materia. stored in these drums, but instead ship the drums in tact in the railroad gondola cars and cover the drums with dried raffinate;

4. Begin captive clothing program as soon as possible; and

5. Have workers wash carefully before eating and minimize smoking while working with the radioactive material.

The following items should also be taken care of as soon as possible:

1. Along the northeastern edge of the property line a quantity of the Congo raffinate material has washed down and under the fence. This material is covering the truck parking lot of the adjacent industry and is definitely a violation of AEC regulations. The parking lot should be scraped clean of this material and the fence line repaired if needed as soon as possible;

2. Where feasible, mechanical equipment should be used to scrape material back away from the fence line especially along the eastern fence border;

3. The settling ponds which will be used with the barber-green dust control equipment are in a sad state of repair. These ponds will need reconditioning before start-up; and

4. In addition to the captive clothing program it is recommended that Cotter supply the laborers with a captive set of boots & that the clothing and boots remain on the storage site. Laborers should be required to shower before leaving. Also, a clean area should be provided, preferably outside the fence line, for eating purposes.

DLB:Smw
Attachment: Figure 1

David L. Brooman

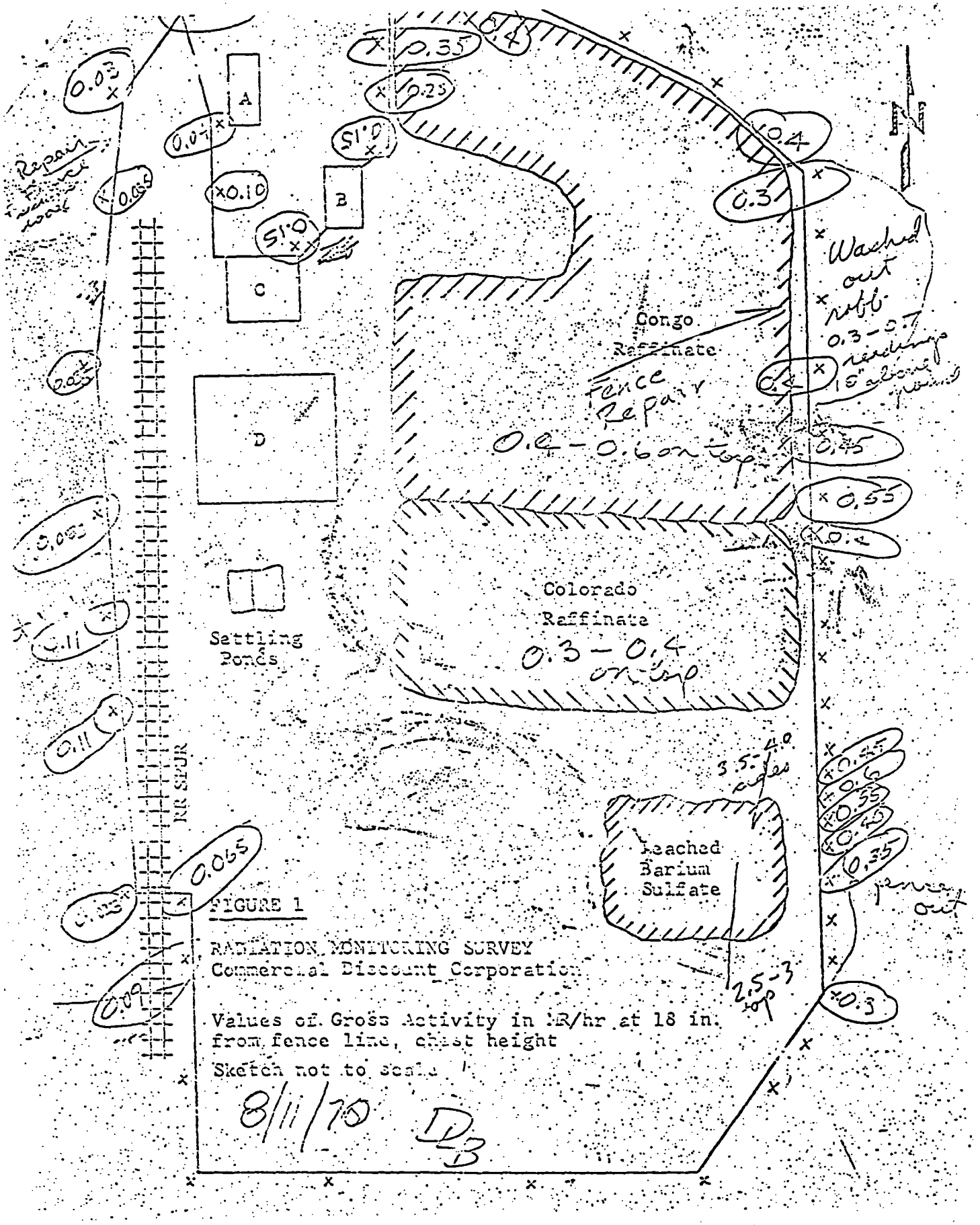


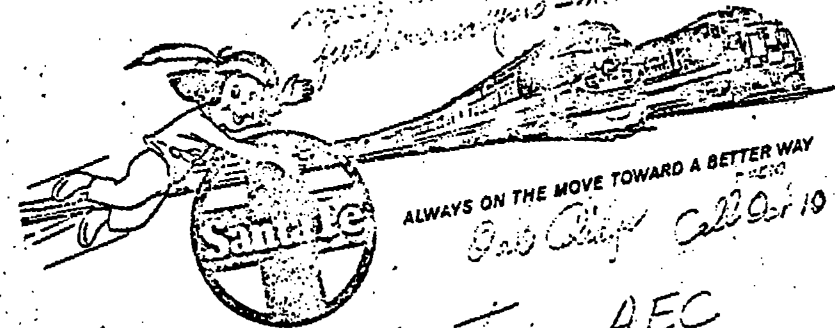
FIGURE 1

RADIATION MONITORING SURVEY
Commercial Discount Corporation

Values of Gross Activity in MR/hr at 18 in. from fence line, chest height

Sketch not to scale

8/11/70 DJ



[illegible] in the process

[illegible] Call Oct 19

Bill Thornton AEC
Safety & Health dept
cost — of disposal
possibly packaging cost
commercial burial ground —
8700 Tons originally — now 2500 tons
information
CDC forced to take entire liability?

Barium Sulfite

NFS

NUCLEAR FUEL SERVICES, INC.

BOX 124 — WEST VALLEY, N.Y. 14171
AREA CODE 716 TELEPHONE 942-3235

December 21, 1971

Mr. Edward J. McGrath
Attorney at Law
260 E. Jefferson Street
Rockville, Maryland 20852

SUBJECT: Waste Burial Services

Dear Mr. McGrath:

At the conclusion of our meeting of December 16, 1971 held at the NFS Rockville office, it was understood that a summary and guidelines was to be submitted to you in order to assist you in an evaluation.

It was understood from the meeting that your client has about one thousand drums of contaminated refuse and about ten thousand tons of mill tailings primarily barium sulfate that is contaminated with radium. The tailings show an activity up to about 2 mr/hr.

As you know, NFS does not offer a packaging service or a transport service but receives radioactive material either by rail or by truck for disposal. The waste burial site is operated under licenses issued by the State of New York and the conditions imposed, though unique, must be complied with. The attached exhibit copy of the radioactive waste shipment record identifies many license requirements. The "General Terms and Conditions Applicable to Radioactive Waste Burial Service" identifies certain other requirements. Prior to receipt of any shipments, NFS further requires a signed copy of the July 1, 1971 letter stating the acceptability of the terms and conditions.

The attached documents should hold most of the answers you require. For further information please call me.

Very truly yours,

R. T. Smokowski
Contract Administrator

RTS:ps
Attch.
cc: W. H. Lewis
C. R. Moore
A. G. Bockelman

NFS

NUCLEAR FUEL SERVICES, INC.

BOX 124 · WEST VALLEY, N.Y. 14171
AREA CODE 716 TELEPHONE 942-3235

July 1, 1971

33C - 154

Gentlemen:

Earlier this year NFS distributed a revised list of general terms and conditions which apply to the receipt of radioactive waste by NFS for burial at its West Valley, New York site. All future purchase orders to NFS covering the burial of radioactive waste must reference acceptance to these terms and conditions.

I have taken the liberty of enclosing another set of the December 14, 1970 terms and conditions applicable to waste burial for your review. To update our files and insure that each of our customers has received a copy of our general terms and conditions applicable to the receipt and burial of radioactive wastes, we request that your firm indicate its acceptance of the terms and conditions on the copy of this memo which is enclosed.

Very truly yours,

NUCLEAR FUEL SERVICES, INC.

A. G. Bockelman

A. G. Bockelman
Manager of Waste Burial

We have read and accept the general terms and conditions applicable to the receipt and burial of radioactive waste at the West Valley, New York plant of Nuclear Fuel Services, Inc. It is further agreed that these terms and conditions shall apply to all shipments of radioactive waste materials to NFS and that all purchase orders covering said shipments shall reference acceptance of these terms and conditions.

_____
Name of Firm

_____
Authorized Signature Title

_____
Date

COTTER CORPORATION

December 6, 197

Dr. Frank Pittman, Director
Division of Waste Management
and Transportation
U.S. Atomic Energy Commission
Washington, D.C. 20545

Re: Cotter Corporation-Decontamination of Storage Site, Hazelwood, Missouri

Dear Dr. Pittman:

Cotter Corporation submits herewith a proposal for decontamination of the site at Latty Avenue, Hazelwood, Missouri upon which certain radioactive residues derived from the processing of Congo uranium ores have been stored.

We propose that the radioactive materials, together with the contaminated fixtures and topsoil remaining on the site be transported and deposited in the Quarry Dump Site maintained by the Atomic Energy Commission in St. Charles County, Missouri at the expense and under the supervision, control and responsibility of Cotter Corporation.

This proposal is submitted upon the basis of a precise evaluation and analysis of the problem by the engineering firm of Ryckman, Edgerley, Tomlinson and Associates, the negotiation by Cotter Corporation by a contract with B & K Construction Company, Inc., St. Louis, Missouri, for the loading, transportation and disposition of the material and the acquisition of all necessary approvals from Missouri State and local authorities. We enclose copies of the engineering report and proposal and of the contract between Cotter Corporation and B & K Construction Company, Inc., which set forth in detail, the manner in which the decontamination process will be effected.

As you and your staff know, Cotter Corporation acquired the residue material in 1967, and in the interim, removed, processed and made ultimate disposition of all residues which could economically be treated except for 15,000 tons of Colorado raffinates which will be shipped to the mill in the

near future. The then remaining material, which is the subject of this proposal, consists principally of leached barium sulfate, miscellaneous residues and debris, comprising approximately 8,900 tons.

We have explored all alternatives to disposition at the Quarry Dump Site and conclude that none of them offer comparable advantages in terms of safety, convenience and economics. The Quarry Dump Site already contains similar radioactive waste and must be considered a permanent burial area, and its location in relation to the Hazelwood storage site insures safe transportation over a distance many times shorter than the nearest available alternative.

We stand ready to provide any further information which you may desire in considering and acting upon this proposal.

Very truly yours,

COTTER CORPORATION

By: David P. Marcott
David P. Marcott,
Executive Vice President

DPM:dkb

PROPOSAL

for

DECONTAMINATION OF LATTY AVENUE STORAGE SITE

HAZELWOOD, MISSOURI

AEC License No. SUB 1022 (40-8025)

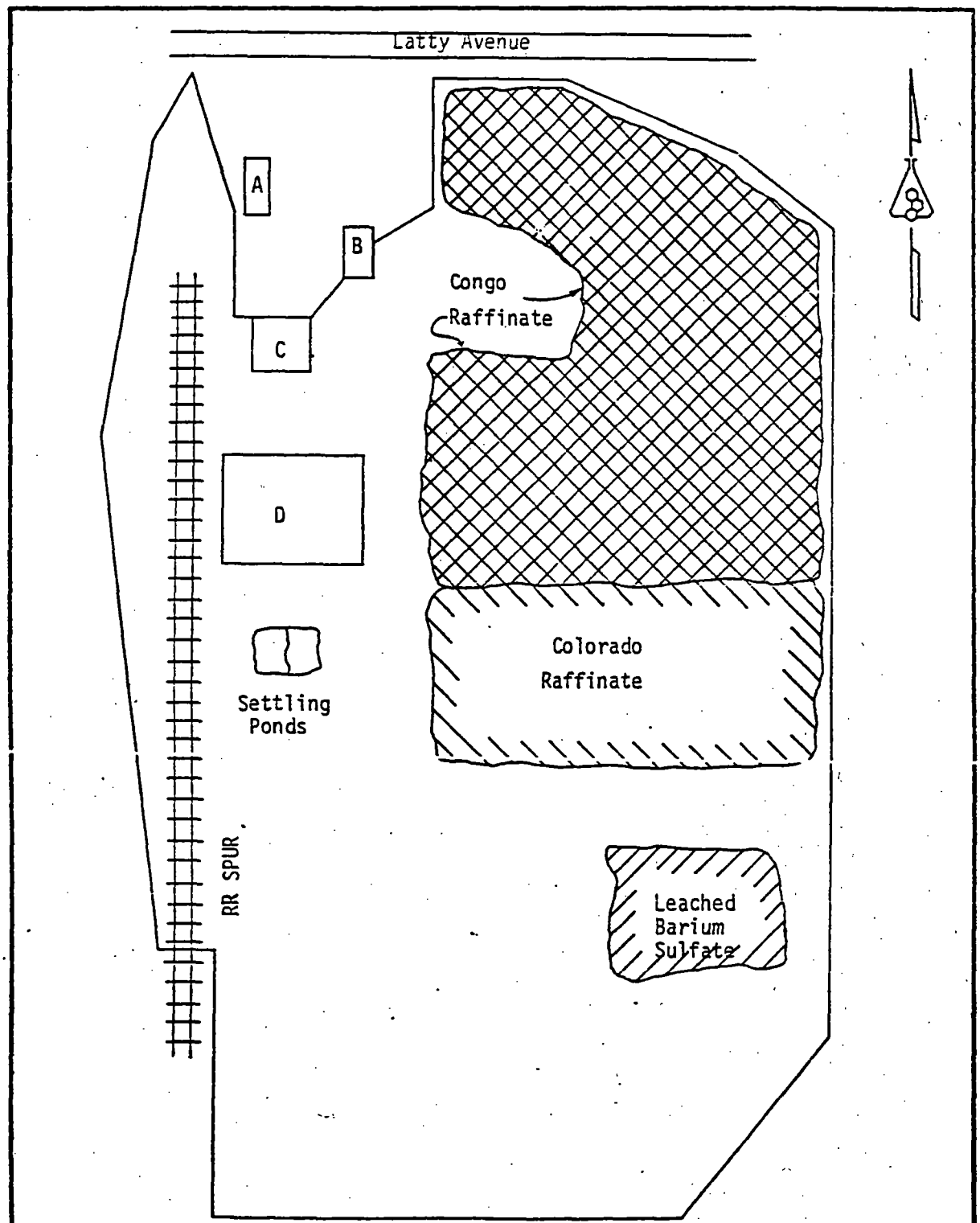
May, 1972

RETA-780

INTRODUCTION

It is the intent of this proposal to provide a means whereby land leased by Cotter Corporation of Golden, Colorado (the Licensee) may be decontaminated and returned for normal land use with no restrictions, in full compliance with all applicable rules and regulations of the Atomic Energy Commission. The property in question consists of approximately seven acres located at 9200 Latty Avenue in Hazelwood, Missouri (see FIGURE 1).

During recent years, the area has been used as a storage and processing site for raffinates and other radioactive residues, and other radioactive debris. This proposal presents a plan of action for decontamination of the site and ultimate disposal of the radioactive residues and debris.



RETA

FIGURE 1

Sketch not to scale

COTTER CORPORATION
LATTY AVENUE STORAGE SITE
HAZLEWOOD, MISSOURI

DESCRIPTION OF WASTE MATERIAL

The history of the residues is a long and complicated one. The most complete historical review of this material was compiled by Walter J. Haubach in August, 1967. This review is included herein as APPENDIX A.

According to Mr. Hauback, the original material was obtained from the Belgian Congo in 1944 for processing by Mallinckrodt at the Destrehan Street Plant in St. Louis. The residues from this facility were then stored on a 21 acre tract, located at Roberston, Missouri. In June of 1960 the residues were offered for public sale for processing or utilization by private industry.

"The intent of the 'Offer for Sale' was to allow private industry to recover the valuable metals: copper, nickel and cobalt. The original request for bid offered the bidder several alternatives. The purchaser could use the

existing site for purposes of concentrating and extracting any desired material, or he could remove the residue from the site for processing or utilization elsewhere. The materials remaining after the purchaser's processing operations were over, could be disposed of by the purchaser at the Weldon Springs dump site whether or not processing was done on the present site or elsewhere. The Weldon Springs Quarry Dump site was a pit located in St. Charles County on Missouri State Highway No. 94 approximately five miles southwest of the Weldon Springs plant and approximately 30 miles from the airport site. The site was accessible by truck from Missouri State Route 94 and a spur track lead off the existing east way of the Atomic Energy Commission's plant track system providing railway access to the dump pit."

Later in 1960, word was received that it was quite unlikely that the private contract would be awarded since the United States Geological Survey forbade the dumping of the sludges, processed or not, into the quarries in question because of the high probability of contaminating the Missouri River shortly above the intakes for the St. Louis City and St. Louis County

water supplies. Due to the many problems, the St. Louis Area Office was contacted by Oak Ridge Operations and asked to hold up awarding any contract on airport sludge.

The material was subsequently obtained, in 1964, (see APPENDIX B) by Continental Mining & Milling Company of Chicago, Illinois. Continental borrowed $2,500,000 from Commercial Discount of Chicago to buy and process the residues, using the residues as security. Continental moved the material from the airport to the present site on Latty Avenue. This move required ten dump trucks for five months and cost Continental $100,000. They were unable to maintain the loan payments while they were moving the material, so Commercial foreclosed the loan.

The Commercial Discount Corporation paid $800,000 for the raffinates at a public auction of the assets of the Continental Mining & Milling Company. It was their only recourse to protect the $2,500,000 investment they had in the raffinates. In this foreclosure procedure, they obtained besides the 100,000 tons of waste material, an office building, three plant buildings and the property upon which the residues are now stored. These

residues were again offered for sale at a public auction on February 3, 1967, and they failed to draw a single bid.

Commercial Discount decided to process the residues themselves by drying and shipping them to Cotter Corporation for mineral extraction [License No. SMC-907 (40-7603)]. The consulting firm of Ryckman, Edgerley, Tomlinson and Associates (RETA), were retained to advise them on radiological health and industrial hygiene problems. In November, 1968, Commercial Discount discontinued operation and the site was shut down.

In August, 1970, Cotter Corporation began drying operations [License No. SUB-1022 (40-8035)] and asked RETA to assist them with personnel monitoring and related radiological health aspects. In August, 1971, Cotter Corporation had completed shipment of the Congo raffinates to their processing site in Colorado. Low concentrations of valuable metals and other elements rendered the remaining material economically unfeasible to process in like manner.

Presently, the remaining material stored on the site includes (see FIGURE 2):

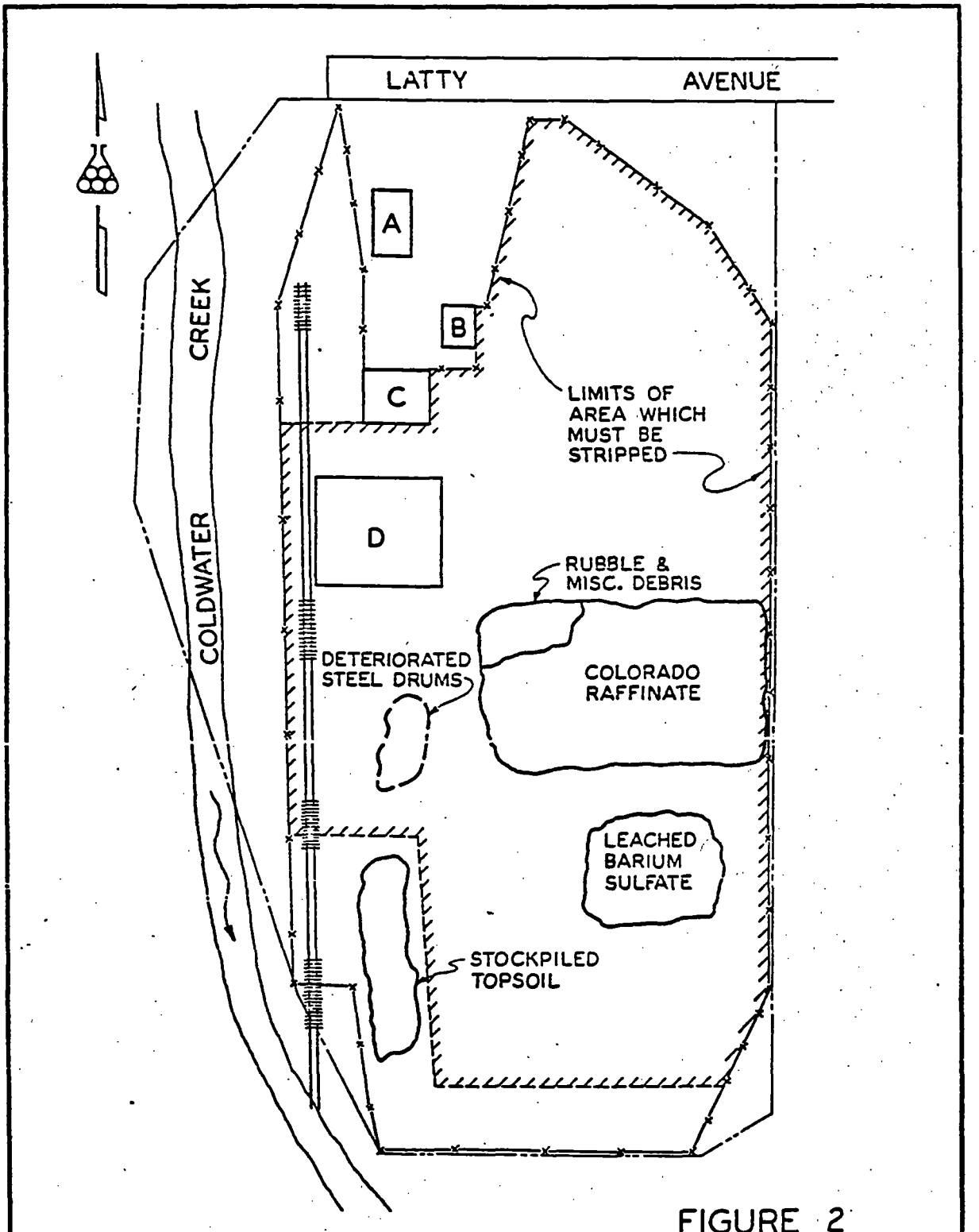


FIGURE 2

RETA

COTTER CORPORATION
LATTY AVENUE
PROCESSING SITE

(1) Colorado Raffinate - 15,000 tons, containing about 45 tons of uranium.

(2) Leached Barium Sulfate Cake - 8,700 tons, containing about 7 tons of uranium.

(3) Miscellaneous Residues - approximately 200 tons, containing approximately 2 tons of uranium.

These residues are stored in deteriorated steel drums and sparsely distributed among pieces of clothing, boots, floor tile and other debris which render the small amount of uranium economically unobtainable. The drums are deteriorated to such a degree that they cannot be moved without disintegration.

A more detailed description of the material remaining can be found in APPENDIX B, pages 8-11.

DECONTAMINATION PROCEDURES

Referring to FIGURE 2, Building "D" is the only building which will require decontamination. Building "A" is an office while Buildings "B" and "C" were used for maintenance and

storage only. These three buildings were protected from contamination by radioactive dust during the drying operations.

Building "D" housed the drying operations and is slightly contaminated (≈0.5 mr/hr). To decontaminate this building it is first necessary to dismantle and steam clean the dryer, conveyors, air pollution equipment, and other miscellaneous machinery. This equipment will then be hauled from the site for subsequent salvage.

After all equipment is removed from the building, its earthen floor will be stripped to eighteen (18") inches below original grade. The ceiling and walls will then be scrubbed to remove any dust particles. Finally, the earthen floor will be brought back up to existing grade using clean, compacted fill material.

The second step of decontamination requires that all uncontaminated solid wastes be removed to a licensed sanitary landfill. Items which will be removed include logs, trees, brush, abandoned appliances and other miscellaneous

debris, which has been dumped on the site by area residents during periods when the operation had been shut down.

All remaining Colorado raffinate will be loaded into railroad cars and shipped to Cotter's processing site for storage. At present, no economical means exist for extracting additional metals from this material. The procedure to be used for shipping the Colorado raffinates will be similar to that for the Congo residue, except that the drying operation will be omitted.

After the Colorado raffinate is removed, the remaining debris, including the leached barium sulfate, will be trucked to the Weldon Springs Quarry dump site, as per the original 1960 proposal. After removal of the radioactive materials from the area, the top soil will be stripped to a depth of 18", or until radioactivity levels come below specified limits (Title 10, Section 20.105). This material will be used to provide cover for the residues in the Quarry.

To recapitulate, it is proposed that the Weldon Springs Quarry Dump site be used as ultimate disposal for the following materials:

Leached Barium Sulfate	2800 c.y.
Rubble & Other Debris	1000 c.y.
Deteriorated Steel Drums & Miscellaneous Items	1000 c.y.
Stripped Top Soil	19200 c.y.
TOTAL QUANTITY (approx.)	24000 c.y.

A cursory visit to the quarry on May 3, 1972, showed the area to be satisfactory for this use. The entire premises is a secured area, adequately fenced and equipped with caution signs. Evidence of past dumping was quite visible and showed a mound of reinforced concrete rubble, steel drums, miscellaneous construction metals, an abandoned fork lift and other equipment. The floor of the quarry is easily accessible from State Highway 94. By carefully placing the radioactive residues and covering them with the stripped top soil, the dumping of this material could, indeed, enhance the overall appearance of the site.

As noted in the 1960 proposal, there is some concern with possible contamination of water supplies. It should be noted, however, that the quarry is placed high above the flood level of the river and; hence; there is no danger of flooding the quarry. Also, past experience with the residues at the Latty Avenue site demonstrated that the material does not exhibit a tendency to "leach" into the ground water. Since beginning work with the residues in February, 1967, there has been no evidence of ground water contamination at the storage site.

RADIOLOGICAL HEALTH PROTECTION PROGRAMS

Because of its inherent physical properties and/or radioactivity level, major health problems are not anticipated. Precautions will be taken, however, to insure that no conditions develop which will endanger the health and safety of employees and the general public.

Personnel Monitoring

As stated in the Application for Source Material License, (see APPENDIX C) "each worker will be issued a film badge." It is proposed that for the decontamination work, the film badge program be discontinued. Under Section 20.202 (a) (1), personnel monitoring is mandatory for persons, over 18 years of age, entering a restricted area that receives, or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the allowable dosage. Previous experience (see TABLE 1) has demonstrated that employees working at the site have not been exposed to dosages in excess of the allowable 25 percent.

TABLE 1

PERSONNEL MONITORING RECORDS*
LATTY AVENUE STORAGE SITE
HAZELWOOD, MISSOURI

BADGE NO.	NO. WEEKS	CUMULATIVE DOSAGE	DOSAGE PER WEEK	MAX. QTRLY. DOSAGE
20	22	M		Control
21	22	120		
22	12	90		
23	22	210		
24	22	230	10.5	136.5 mr
25	12	60		
26	20	200		
27	10	50		
28	21	210		
29	4	M		
30	Not Issued	-		
31	11	120		
32	11	120		
33	11	130	11.8	153.4 mr

Average dosage = 7.8 mr/wk = 101.4 mr/qtr.

Maximum allowable without personnel monitoring;
25% of 1-1/4 rem = 312.5 mr/qtr.

*Records obtained from Film Badge monitoring program for period of drying operation (8/70-2/71).

Indeed, radiation levels have been reduced to such a degree that the maximum count on the premises (1.8 mr/hr) falls below the allowable for an unrestricted area as defined by Section 20.105 (b) (1). To insure dosages received are below the limits, it is proposed that no person under 21 years of age be employed for the decontamination work.

Effluents To Unrestricted Areas

The Application for Source Material License also outlines procedures for monitoring the movement of dust to other areas. Past experience has shown that the hydrophilic nature of the material acts to maintain a relatively dust-free area. High volume air samples will be taken at periodic intervals, as required, and at selected locations to assure the lack of dust generation.

With scrubbing operations being conducted at the site, special provisions will be made to limit the amount of radioactive material being added to the adjacent stream. Water generated by the washing operations will be diverted to a

settling basin for removal of suspended particles. Due to the inability of this material to "leach," the supernatant from the basin may be diverted to Cold Water Creek without exceeding the limits allowed under Section 20.106. Routine monitoring of the effluent to Cold Water Creek will be made to insure that the limits are met.

In connection with the discharge to Cold Water Creek, it should be noted that the stream receives discharges from several industries. It drains an industrial/business zone and contact with it by individuals is rare.

To minimize the spillage of radioactive materials during hauling to the dump site, extra care must be taken. A route has been selected which will, essentially, eliminate hauling through any residential areas. The route begins at Latty Avenue, through an industrial zone to Graham Road, north on Graham Road to Interstate 270, west on I-270 to Interstate 70, west on I-70 to State Route 94 in St. Charles and south on State 94 to the Quarry Dump site. This route is a total of 32 miles in length.

Each truck will be equipped with a tarpulin for use in covering the material to prevent blowing. The bed, cab and wheels of each truck will be brushed clean of all extraneous material before it is allowed to leave the site.

As part of the program to safeguard the public safety, the above proposed plan will be discussed with appropriate state agencies i.e., Missouri Division of Health, Bureau of Radiological and Occupational Health, and the Missouri Highway Patrol. In addition to the proper AEC officials, these agencies will be contacted promptly in case any emergency should arise during transport.

SUMMARY

The proposal, as outlined above, is a bonafide attempt to provide a means for the ultimate disposal of residual contaminated material. As noted earlier, this material has had a long history which includes several incidents requiring change of location. Each time this material is moved, it represents a potential hazard to the general public safety and health.

This proposal provides the opportunity for the final transportation of this material, which complies with Federal, State and local regulations.

APPENDIX "A"

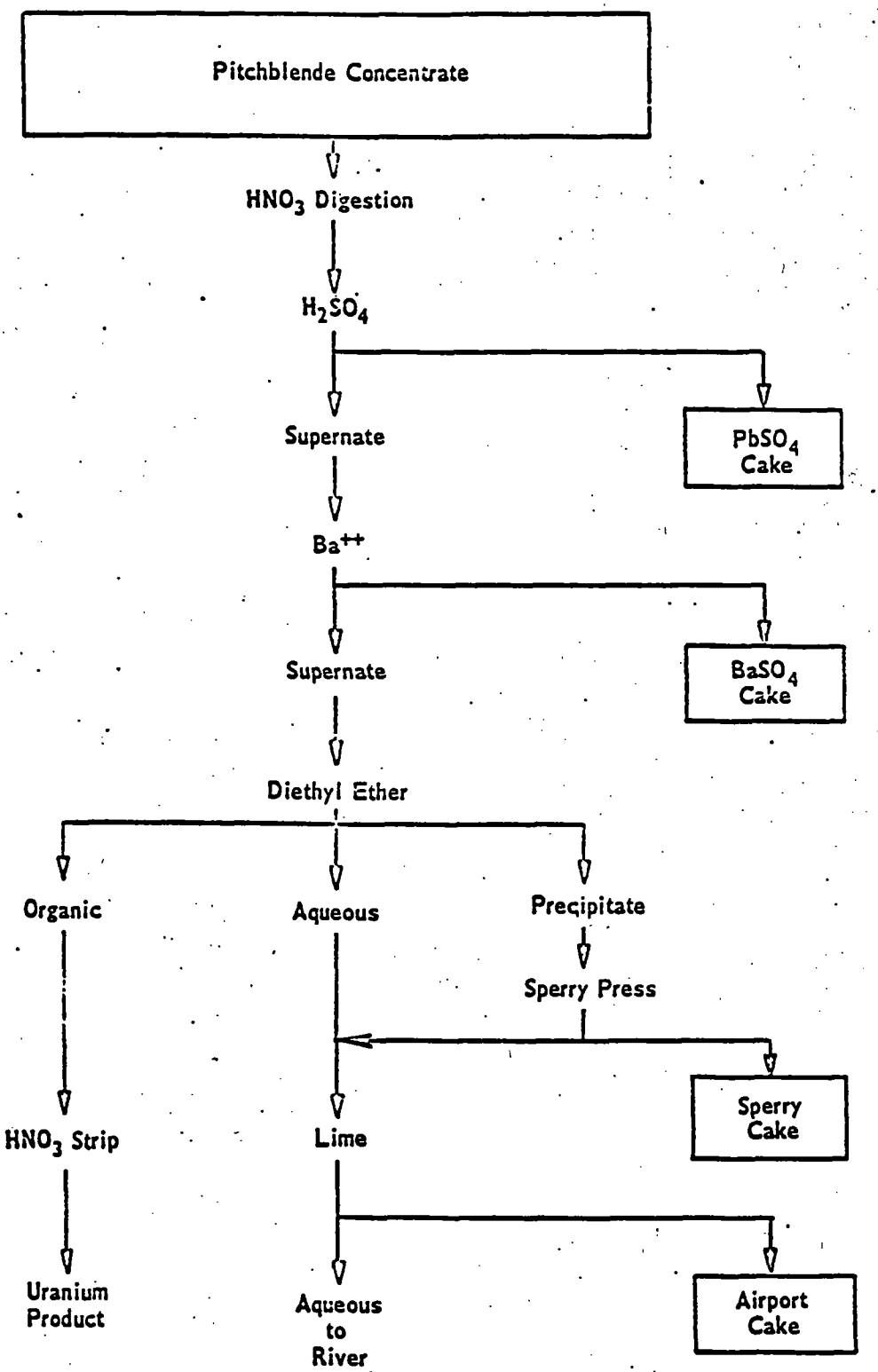
APPENDIX "A"

HISTORICAL REVIEW OF THE MALLINCKRODT AIRPORT CAKE

In discussing the history of the airport cake raffinates, it is necessary to define them and this has been attempted by the simplified flowsheet given in Figure 1. Most of the pitchblende processed by Mallinckrodt was obtained as a concentrate from the Belgian Congo in 1944 and was shipped to St. Louis from the Congo in 55-gallon metal drums. The pitchblende was digested in 56 per cent nitric acid (93-102°C) followed by sulfuric acid to precipitate the lead and radium when the ore had a low sulfate content. The precipitate was removed by a string-discharge rotary vacuum filter and was usually leached with sodium carbonate to remove residual uranium. The sulfate cake was stored in a separate location since the Belgians (African Metals) maintained ownership of the radium. These residues are presently stored at the Lake Ontario Ordnance works at Niagara Falls, New York. Some pitchblende was also processed at Fernald and a similar cake, still stored in silos at National Lead Company in Cincinnati, is known as Fernald's K-65 residue.

Barium carbonate slurry was then added to the supernate to remove the excess sulfate. The barium sulfate cake was removed by a continuous solid-bowl centrifuge, leached with sodium carbonate, and also stored in a separate area. The supernate was made 1 N in nitric acid and the uranium extracted with diethyl ether. The uranium was stripped from the ether with dilute nitric acid. In the first extraction column a precipitate formed which was, on occasion, removed by a Sperry Filterpress. The Sperry Cake was found to be a good source of protactinium-231 and Mound processed about 20 tons (about eighty 55-gallon drums) and obtained approximately two grams of protactinium-231. The supernate from the Sperry Press and the aqueous uranium tails were de-etherized and treated with a hydrated lime slurry. The supernate from a continuous rotary vacuum leaf filter was discharged to the river, and the limed fraction became the airport cake. The cake, up until 1960, was about 25 feet high and covered three acres.

Figure 1


Pitchblende Concentrate
HNO_3 Digestion
H_2SO_4
Supernate
$PbSO_4$ Cake
Ba^{++}
Supernate
$BaSO_4$ Cake
Diethyl Ether
Organic
Aqueous
Precipitate
Sperry Press
Sperry Cake
HNO_3 Strip
Lime
Uranium Product
Aqueous to River
Airport Cake

There were also small amounts of raffinates present at the airport from the processing of lower grade uranium ores. A small amount of pitchblende was processed at the National Lead Company at Fernald near Cincinnati, Ohio, but the majority was processed by Mallinckrodt at the Destrehan Street plant in St. Louis.

The residues from the uranium facility in St. Louis were stored originally on a 21-acre tract located at Robertson, Missouri, located immediately north of Lambert Field, the St. Louis Municipal Airport (old Robertson Field) and east of the McDonnell Aircraft Corporation plant on Brown Road in St. Louis County. Hence, the term "airport cake."

The material obtained from processing carnotite and other low grade domestic ores was kept separate. The thorium-232 to 230 ratio was 15 to 20 in the carnotite residues and about eight in the pitchblende residues.

In 1955, Mallinckrodt processed some of the pitchblende residues from the airport cake and sent a concentrated $Th(NO_3)_4$ solution to Mound. Mound purified and concentrated approximately a kilogram of thorium-230 from this material. The thorium product was concentrated to the extent of about 190 grams per liter of total thorium and 20 grams per liter of thorium-230. The uranium content was less than 0.03 grams per liter and the other impurities were all below 100 parts per million.

This material was in a solution approximately one normal in nitric acid. Pulse-height analysis showed the material to have only 2.6 per cent of the alphas with energy below 4.53 mev, about 0.7 per cent of the alphas from thorium-227 and daughters, and less than 0.03 per cent from thorium-228.

The airport residues were offered for public sale in June of 1960 and were described as containing five different waste items. The content of these five items is shown in Table 1 as defined in the "Offer for Sale."

Table I

	Total Weight (Tons)	Uranium Content (Tons)	Description
#1	74,000	113	Pitchblende Raffinate[1]
#2	32,500	48	Colorado Raffinate
#3	2,500	22	Ba_2SO_4 Cake (unleached)
#4	8,700	7	Barium Cake (leached)
#5	350	2	Miscellaneous Residues
	117,050	192	

[1] Estimated to contain

1,775,000 pounds Cobalt
2,085,000 pounds Nickel
1,098,000 pounds Copper

The intent of the "Offer for Sale" was to allow private industry to recover the valuable metals: copper, nickel, and cobalt. The original request for bid offered the bidder several alternatives. The purchaser could use the existing site for purposes of concentrating and extracting any desired material or he could remove the residue from the site for processing or utilization elsewhere. The materials remaining after the purchaser's processing operations were over could be disposed of by the purchaser at the Weldon Springs dump site whether or not processing was done on the present site or elsewhere. The Weldon Springs Quarry Dump site was a pit located in St. Charles County on Missouri State Highway No. 94 approximately five miles southwest of the Weldon Springs plant and approximately 30 miles from the airport site. The site was accessible by truck from Missouri State Route 94 and a spur track lead off the existing east way of the Atomic Energy Commission's plant track system providing railway access to the dump pit.

In response to a request in 1960, Mound made a cost estimate based on a production rate of 1,000 grams of thorium-230 per year over a two to five-year period on the assumption the airport cake in St. Louis would be available. Presumably it may have been possible for Mound to obtain the thorium waste stream from the private contractor, however, the cost estimate was based on starting with unprocessed airport cake. Including manpower, shipping, material, and amortization of capital costs over a five-year period, the estimated cost of the thorium-230 was about $300 per gram. At that time, Mound was also instructed to make a survey of all uranium mills in the country to determine if other potential sources of thorium-230 existed from which this amount of production could be economically maintained. This survey is compiled in MLM-1439, "Survey of Sources of Ionium, Thorium-230," by P. E. Figgins and H. W. Kirby.

Mound received word in September 1960 that the St. Louis Area Office was recommending that the bid be awarded to Contemporary Metals; a company having a "portable processing plant." The AEC talked with them about their probable process which was to be carried out on site and it seemed that they were interested primarily in the cobalt and nickel. However, they also would have a side stream for concentrating scandium and expected thorium to go into that stream.

Later in 1960, word was received that it was quite unlikely that the private contract would be awarded since the United States Geological Survey forbid the dumping of the sludges, processed or not, into the quarries in question because of the high probability of contaminating the Missouri River shortly above the intakes for the St. Louis City and St. Louis County water supplies. Due to the many problems, the St. Louis Area Office was contacted by Oak Ridge Operations and asked to hold up awarding any contract on airport sludge until the long range requirements for thorium-230 could be fixed.

It is not clear exactly what transpired at this point (perhaps Contemporary Metals bankrupted) since the material was subsequently obtained by Continental Mining and Milling of Chicago

for $126,000. Continental borrowed $2,500,000 from Commercial Discount of Chicago to buy and process the residues, using the residues as security. Continental moved the material from the airport to another site in suburban Hazelwood. This move required ten dump trucks for five months and cost Continental $100,000. They were unable to maintain the loan payments while they were moving the material, so Commercial foreclosed the loan.

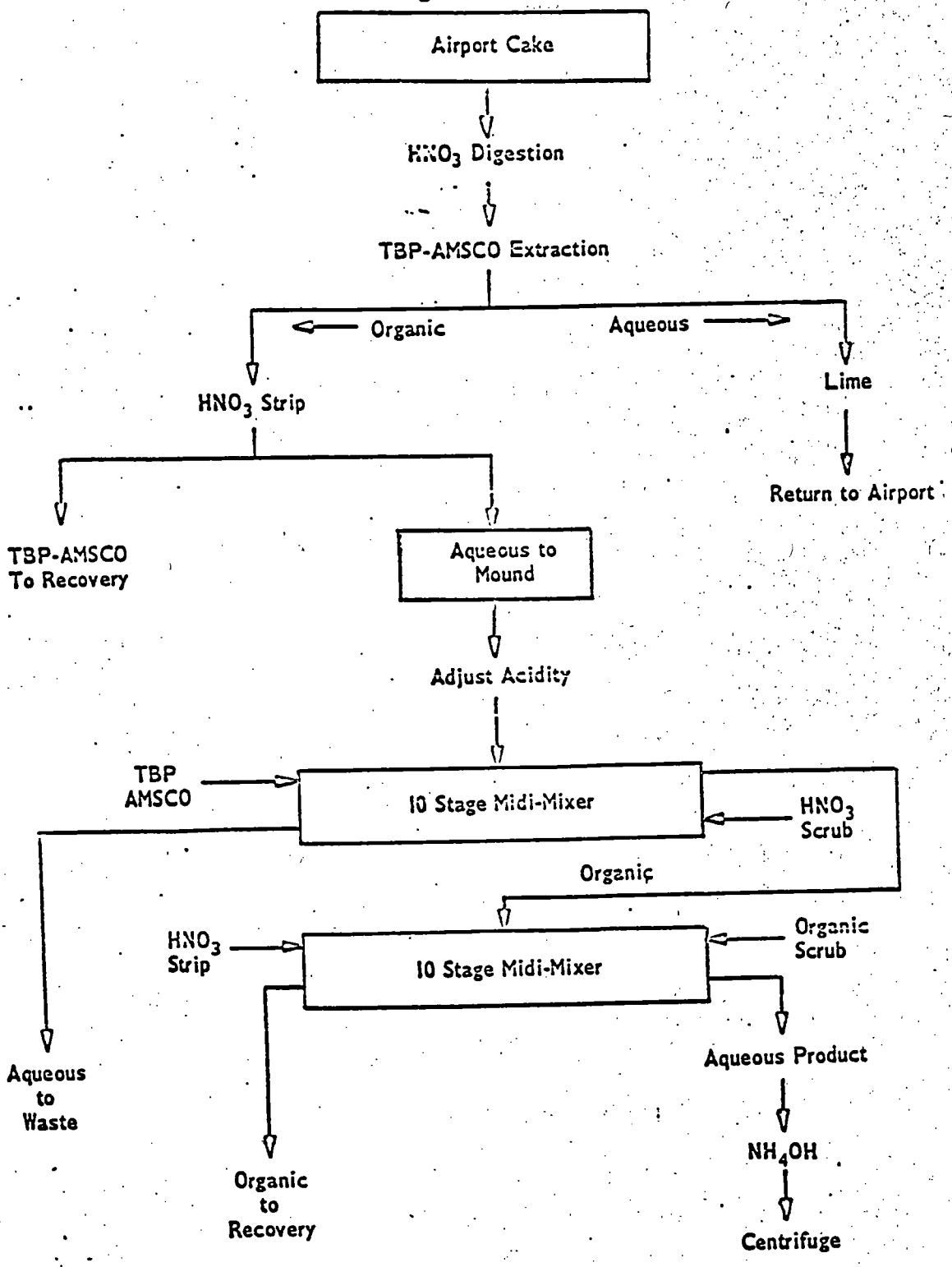
The Commercial Discount Corporation paid $800,000 for the raffinates at a public auction of the assets of the Continental Mining and Milling Company. It was their only recourse to protect the $2,500,000 investment they had in the raffinates. In this foreclosure procedure, they obtained besides the 100,000 tons of waste material, an office building, three plant buildings and the property upon which the residues are now stored. These residues were again offered for sale at a public auction on February 3, 1967, and they failed to draw a single bid.

After moving the raffinate from the original site to the site in Hazelwood, the most recent estimate now is that it comprises a hundred thousand tons total and contains 947,414 pounds of copper, 3,338,808 pounds of nickel, 2,726,980 pounds of cobalt, and 100,000 pounds of selenium. Presumably, the uranium content is still 192 tons and it contains about 2,250 kilograms of thorium-232 and 250 kilograms of thorium-230. It is not clear what has changed the original estimate as to total content; a better weight, a worse weight, better analysis, more homogeniety, etc. Since the uranium content is assumed to be the same and the total weight decreased about 17,000 ~~pounds~~, it could be inferred that no material was lost and that the uranium was better known due to accountability requirements.

Figure 2 is a flowsheet showing the processes used at Mallinckrodt and Mound Laboratory in 1955 for preparing approximately ten kilograms of thorium containing one kilogram of thorium-230. The primary problem during the workup of the large scale proposal mentioned earlier was again what to do with the waste material. This still remains one of the main problems. One runs a serious risk of ending up with more residues than one started with.

Perhaps the #4 material (shown in Table I) was omitted from the move. This would appear to be the less valuable, and would account for about half of the difference.

Figure 2


Airport Cake
HNO_3 Digestion
TBP-AMSCO Extraction
Organic
Aqueous
HNO_3 Strip
Lime
Return to Airport
TBP-AMSCO To Recovery
Aqueous to Mound
Adjust Acidity
TBP AMSCO
10 Stage Midi-Mixer
HNO_3 Scrub
Organic
HNO_3 Strip
10 Stage Midi-Mixer
Organic Scrub
Aqueous to Waste
Organic to Recovery
Aqueous Product
NH_4OH
Centrifuge

A flowsheet for the removal of other than the thorium and uranium has not been developed and this now seems a reasonable thing to do at this point. If ten or fifteen drums of this material were processed to develop a flowsheet for the recovery of the thorium, uranium, copper, nickel, cobalt, selenium, and a rare earth fraction, it might be possible to reduce the radioactive contamination of the final waste raffinates such that they would be no problem and could be disposed of almost anywhere.

The 250 kilograms of thorium-230 contained in these raffinates are more interesting than ionium per se; cost estimates are already in existence for irradiation to protactinium-231 and subsequent irradiation to uranium-232. Mound has twelve thorium-230 slugs on hand that were irradiated in the MTR at Idaho Falls in 1960. It is planned to process these capsules in order to develop a flowsheet for the production of protactinium-231.

APPENDIX "B"

UNITED STATES
ATOMIC ENERGY COMMISSION
OAK RIDGE OPERATIONS
P.O. BOX E
OAK RIDGE, TENNESSEE 37830

AREA CODE 615
TELEPHONE 483-8611

May 8, 1969

Cotter Corporation
410 Macon Avenue
Post Office Box 751
Canon City, Colorado 81212

Attention: Mr. Warren Goff

Dear Mr. Goff:

In accordance with your telephone request of May 7 there is enclosed a copy of the Invitation to Bid issued for the sale of the Airport Residues in 1964.

We trust that your development work with the centrifuge process will result in a satisfactory process for the Weldon Spring Raffinates.

If we can be of further assistance please advise.

Very truly yours,

ORIGINAL SIGNED BY
D. B. POLLEY

D. B. Polley, Chief
Property Branch
Supply Division

AUP:DBP

Enclosure:
As stated above

Sales

GOVERNMENT PROPERTY

Sealed bids in triplicate subject to the terms and conditions set forth herein, for the purchase and removal of the Government-owned property listed in this Invitation, will be received until the time, date, and at the place indicated below, and then publically opened.

Time of Opening - 2:00 p.m. CST
Date of Opening - March 18, 1964
Place of Opening - Atomic Energy Commission Office
Weldon Spring, Missouri
Bid Deposit of $10,000 or 10% of bid price whichever is greater is required
Inspection Invited between 8:00 a.m. and 4:00 p.m., Monday through Friday
Arrange with H. R. Osterwald or C. H. Fisher,
Telephone ST. Louis WY-3-9400
Issued by St. Louis Area Office
U. S. Atomic Energy Commission
Address: Box 470, St. Charles, Missouri 63302

Property located in open storage on a 21-acre tract at Robertson, Missouri, immediately north of St. Louis Municipal Airport and east of McDonnell Aircraft Corporation Plant on Brown Road in St. Louis County. Residues stored are shown on attached drawing subject, "Topographical Location of Plant Facilities for Mallinckrodt Chemical Works," MCW Drawing No. 6-1403-19.

EXHIBIT 3 PAGES 4

INSTRUCTIONS AND INFORMATION TO BIDDERS

1. The property offered for sale under this Invitation is the same as previously offered for sale under Invitation No. AT-(23-2)-46 dated March 7, 1962. and Invitation No AT-(23-2)-52 dated Jan 10, 1964

2. The Bidder's attention is called to information required in Financial and Experience Questionnaire, pages 4 and 5, which must be given to qualify bid.

3. The Bidder's attention is called to the requirement in Article V Special Conditions that the successful Bidder will be required to obtain a license prior to the removal of any residues from the site.

4. The Bidder's attention is called to the Description contained in Article I of the Special Conditions, specifically to the relatively large quantities of rare elements contained in the pitchblende raffinate which contains one of the largest known amounts of concentrated scandium and ionium.

5. Bidders should note the requirement for a performance bond which shall be written in terms which will guarantee the removal of all residues.

6. THE BIDDER IS ADVISED THAT THE ATOMIC ENERGY COMMISSION WILL NOT PURCHASE THE URANIUM RECOVERED FROM PROCESSING OF RESIDUES TO BE PURCHASED UNDER THIS INVITATION.

7. Samples. Bidders are invited to inspect the residues at the site and to take samples for the purpose of making their own estimates and assays of the quantities and contents of the materials for sale. Bidders may select a reasonable quantity, as determined by the Government, of samples for their retention and use for testing purposes. These samples and necessary labor and containers required for selecting and preparing the samples for shipment will be furnished without charge to the Bidder. Shipping costs shall be borne by the Bidder.

8. Bid deposits should be made payable to the U. S. Atomic Energy Commission.

SALE OF GOVERNMENT PROPERTY

BID

Date of Bid: _____, 19 ___

In compliance with Invitation No. AT-(23-2)-52 as identified on the cover page hereof and subject to the General and Special Terms and Conditions attached hereto and the instructions to bidders, all of which are incorporated as a part of this Bid, the undersigned offers and agrees, if this Bid be accepted within_____ calendar days (60 calendar days if no period be specified by the Bidder, but not less than 10 calendar days in any case) after date of Bid opening, to purchase the residues hereinafter described and to remove same within the specified number of calendar days after notice from the Government to proceed. There is attached a bid deposit in the amount of $10,000.

Item	Description	Bid Price
All residues located at the Airport Site	As described in Article I	Lump sum of $_____

Bidder Represents: (Check one)

1. That he /_/ is, /_/ is not, a small business concern.

2. If Bidder represents he is a small business concern, he further represents his applicable classification as:

   (Check one) /_/(a); /_/(b); /_/(c); /_/(d).

3. (a) That he /_/ has, /_/ has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the Bidder) to solicit or secure this contract, and (b) that he /_/ has, /_/ has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the Bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. (For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 44, Part 150.)

Acceptance by the Government

By _____

Title _____

Date _____

_____
Name of Bidder (Type or Print)

_____
Address of Bidder (Type or Print)

_____
Signature of Person Authorized to Sign Bid

_____
Signer's Name and Title (Type or Print)

DATE _____

FINANCIAL AND EXPERIENCE QUESTIONNAIRE

1. NAME OF COMPANY _____
2. BUSINESS ADDRESS _____
3. SOLE PROPRIETORSHIP ☐ *PARTNERSHIP ☐ **CORPORATION ☐ (CHECK ONE)
   *IF PARTNERSHIP, LIST GENERAL PARTNERS:
   _____
   _____
   **IF CORPORATION, LIST STATE IN WHICH INCORPORATED _____
4. AGE OF FIRM _____(YEARS)
5. NET WORTH $ _____(CERTIFIED COPY OF LATEST BALANCE SHEET PREFERRED.)
6. LIST BANK REFERENCE _____
7. LOCATION OF PLANT IN WHICH RESIDUES WILL BE PROCESSED _____
   _____
   _____
   _____
8. PLANT'S PRESENT USE OR PAST IF NOT OPERATING _____
   _____
9. CAPACITY OF PLANT IN TONS/DAY _____
10. CHEMICAL PROCESSING EXPERIENCE OF COMPANY _____
    _____
    _____
    _____

11. PAST EXPERIENCE IN PROCESSING SOURCE MATERIALS _____

_____

_____

_____

12. THE UNDERSIGNED HEREBY CERTIFIES THAT THE INFORMATION FURNISHED ABOVE IS TRUE AND CORRECT.

COMPANY: _____

BY: _____

TITLE: _____

NOTE: THE COMMISSION RESERVES THE RIGHT TO DISQUALIFY ANY PROSPECTIVE BIDDER OR ACTUAL BIDDER OR TO TERMINATE ANY CONTRACT AWARDED IF THERE IS A FAILURE TO ANSWER THE FOREGOING QUESTIONS FULLY AND TRUTHFULLY.

(IF MORE SPACE IS NEEDED, PLEASE USE SPACE BELOW OR BACK SIDE.)

GENERAL SALE TERMS AND CONDITIONS

1. Inspection. The Bidder is invited, urged, and cautioned to inspect the property to be sold prior to submitting a bid. Property will be available for inspection at the places and times specified in the Invitation. In no case will failure to inspect constitute grounds for the withdrawal of a bid after opening.

2. Consideration of Bids. The Bidder agrees that his bid will not be withdrawn within the period of time specified for the acceptance thereof following the opening of bids (sixty (60) calendar days if no period be specified by the Government or by the Bidder but not less than ten (10) calendar days in any case) and that during such period his bid will remain firm and irrevocable. The Government reserves the right to reject any or all bids, and to waive any technical defects in bids as may be in the best interest of the Government.

3. Responsibility for Property Sold. The Purchaser assumes all responsibility and liability for the property after the date of the Government's acceptance. The Government will exercise its usual care for protection of the material, but the Government will not be responsible for any loss or damage from any cause whatsoever.

4. Limitation on Government's Liability. Except for transportation charges when a return of property at Government cost is authorized by the Government, the measure of the Government's liability in any case where liability of the Government to the Purchaser has been established shall not exceed refund of such portion of the purchase price as the Government may have received.

5. Oral Statements and Modifications. Any oral statement or representation by any representative of the Government, changing or supplementing this contract or any Condition thereof, is unauthorized and shall confer no right upon the Purchaser.

6. Covenant Against Contingent Fees. Purchaser warrants that no person or agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial agencies maintained by the Purchaser for the purpose of doing business. For breach of this warranty, the Government shall have the right to annul this contract without liability or at its option, to recover from the Purchaser the amount of such commission, percentage, brokerage, or contingent fee, in addition to the consideration herein set forth.

7. Officials Not to Benefit. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, unless it be made with a corporation for its general benefit.

8. Disputes. Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Purchaser. The decision of the Contracting Officer shall be final and conclusive unless, within thirty (30) days from the date of receipt of such copy, the Purchaser mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the Commission. The decision of the Commission or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Purchaser shall be afforded an opportunity to be heard and to offer evidence in support of his appeal. Pending final decision of a dispute hereunder, the Purchaser shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

9. Definitions. As used throughout this contract, the following terms shall have the meaning set forth below:

(1) The term "Contracting Officer" means the person executing the contract on behalf of the Government and includes his successors or any duly authorized representative of such person.

(2) The term "Commission" means the United States Atomic Energy Commission or any duly authorized representative thereof, including the Contracting Officer except for the purpose of deciding an appeal under Paragraph 8 hereof entitled "Disputes".

(3) The words "residues", "property" and "material(s)" are used interchangeably throughout this document and refer to the uranium-bearing material described in Article I.

SPECIAL CONDITIONS

ARTICLE I - DESCRIPTION OF RESIDUES

The residues offered for sale consist of uranium-bearing material accumulated by the Commission during its uranium refining activities at its Destrehan Street Plant, St. Louis, Missouri. The gross weights listed below are the approximate weights of the residues hauled to the site from the refinery. They do not include stone added for ramps and roads, earth added by rehandling of the residues, or moisture changes. In this connection, some of the existing roadways are constructed on residues offered for sale and the existing levels of these roadways are not indicative of the depth of the piles of residues at any given location. The estimated uranium content is based on an accumulation of assays taken on pipe samples from each batch hauled to the site. It is understood that the estimated weights and assays shown below are in no way guaranteed. Purchasers must rely on their own determinations as to qualitative and quantitative contents of the residues to be sold, which are generally described as follows:

Pitchblende Raffinate

The pitchblende raffinate is a residue resulting from processing Belgian Congo pitchblende together with other uranium concentrates. Approximate gross weight is 74,000 tons containing about 113 tons of uranium.

A systematic auger sampling program for the pitchblende raffinate piles was performed in June of 1953. Based on thirty-seven sample holes which provided ninety-six analytical samples, the metal values in approximately 50,000 tons of residue existing at that time were estimated as follows:

1,553,000 lbs. of Cobalt
1,845,000 lbs. of Nickel
971,000 lbs. of Copper

Subsequent additions of raffinate to these piles increased the gross weight to approximately 74,000 tons. Assuming the copper, cobalt and nickel content of the pitchblende ore processed during this period was the same as processed prior to June 1953 and neglecting any contribution to the metal values by other uranium-containing materials processed during this period, the total metal values in the present pile are estimated as follows:

1,775,000 lbs. of Cobalt
2,085,000 lbs. of Nickel
1,098,000 lbs. of Copper

Other samples on which more complete analyses were made are shown in Table I. Due to the heterogeneity of the pitchblende raffinate, these analyses should be considered indicative of the composition of the material and in no sense representative of the gross composition.

Table I

Pitchblende Raffinate Composition

	1 (a)	2 (b)	3 (c)
Al	0.22%	0.26%	1.3%
Ca	11.0	11.9	2.7
Co	2.8	3.3	1.8
CO_2	1.4	1.9	--
Cr	--	--	0.02
Cu	0.9	1.95	0.9
Fe	1.2	1.4	0.7
Mg	5.0	1.9	0.04
Mn	0.12	0.16	0.04
Mo	0.33	0.23	0.03
Ni	4.1	3.5	3.1
NO_3	27.1	25.2	8.3
P_2O_5	0.96	1.1	--
Pb	Tr	Tr	1.8
R.E.	--	--	0.22(d)
S total	0.8	1.47	--
Sc	--	--	0.015
Si	5.56	4.69	0.32
Sr	--	--	0.02
Th	--	--	0.0038(e)
Ti	--	--	0.007
U	0.13	0.13	0.14
V	Nil	Nil	0.3
Y	--	--	0.04
Solids	50.3	50.7	--
L.O.I @ 500°C	--	--	49.7
Soluble Matter	46.2	43.1	--

(a) 30-gallon sample from 3 locations using 4-inch auger, taken in February 1953. Reported on solids basis.

(b) 30-gallon shovel sample from surface of piles in 35 different locations, taken in February 1953. Reported on solids basis.

(c) Sample taken in the spring of 1955 from an area containing raffinate produced during a period in which primarily pitchblende was processed. Reported on ignited basis.

(d) Approximate rare earth distribution shown in Table II.

(e) Sample contained 0.00039% ionium.

Table II

Rare Earth Distribution for Pitchblende Raffinate
Sample 3 in Table I

Element	% of Total Rare Earths
La	3.5
Ce	6.0
Pr	7.7
Nd	13.5
Sm	5.3
Eu	5.0
Gd	16.9
Tb	7.0
Dy	24.3
Ho	2.4
Er	4.6
Tm	0.7
Yb	2.6
Lu	0.07

Colorado Raffinate

The Colorado raffinate is a heterogeneous residue resulting from processing primarily domestic uranium concentrates. Approximate gross weight is 32,500 tons containing about 48 tons of uranium. Estimated composition of the Colorado raffinate on an ignited basis is as follows:

	%		%
Al_2O_3	2.1	P_2O_5	1.2
CaO	41.8	PbO	0.05
Co	0.13	SO_3	15.8
Fe_2O_3	8.7	SiO_2	5.4
Halides	0.2	Th	0.1 - 1.0
MgO	21.2	TiO_2	0.2
MnO_2	0.8	U	0.62
MoO_3	0.05	V_2O_5	1.1
Na	0.5 - 5.0	Loss on Ignition	76.17
Ni	0.10		

Ag, As, B, Ba, Be, Bi, Cd, Cr, Cu, Ga, In, K, Nb, Sb, Sn, Sr, W, Y, Zn and Zr - all less than 0.1% each.

The nitrate content of the Colorado raffinate is similar to that of the pitchblende raffinate.

Barium Sulfate Cake (Unleached)

Barium sulfate cake (unleached) is a residue resulting from the refinery operation. Approximate gross weight is 1,500 tons containing about 22 tons of uranium. Composition of the cake is estimated as follows:

Barium Sulfate	60-80%
H_2O	15-35%
Uranium	1-2 %
Misc. Pb, Cu, Ni, Fe, etc.	1-2 %
Solids - rock, gravel, sand, etc.	1-2 %

Barium Cake (Leached)

Barium cake (leached) is a residue resulting from the refinery operation. Approximate gross weight is 8,700 tons containing about 7 tons of uranium. Composition of the cake is estimated as follows:

Barium Sulfate	60-80%
H_2O	15-35%
Uranium	0.05-0.15%
Miscellaneous Metals	1-2 %
Solids - rock, gravel, sand, etc.	1-2 %

Miscellaneous Residues

The miscellaneous residues with a gross weight of approximately 350 tons containing approximately 2 tons of uranium are stored in deteriorated drums. No other information is available on these residues.

ARTICLE II - QUANTITIES TO BE REMOVED

All material lying within the cross-hatched areas shown on Drawing No. 6-1403-19, which is attached hereto and made a part hereof, shall be removed by the Purchaser. If advantageous to the Purchaser, he may remove any residues lying immediately outside the cross-hatched areas.

All residues above ground level shall be removed within the cross-hatched areas. In case of disagreement on ground level elevations, they shall be established by producing 2' contours from elevations taken along perimeter fence and assuming there is uniform change in elevations along the north-south grid lines. If advantageous to the Purchaser, he may remove residues and/or contaminated earth below determined ground level.

Stone and other debris contained in the residue piles may be left on the site in designated areas established by the Contracting Officer. Upon completion of the Purchaser's removal operation, he shall leave the area in a graded condition providing drainage to the west end of the property.

ARTICLE III - SITE FACILITIES AVAILABLE FOR REMOVAL

The existing railroad spur, loading dock and tipple, covered storage area, office and change house will be available for use by the Purchaser without charge. Electric power and water are available at the site at the Purchaser's expense.

ARTICLE IV - DISCLAIMER OF WARRANTY

The Government makes no guaranty, warranty, or representation, expressed or implied, as to the kind, size, weight, quality, character, description, or condition of the material; or its fitness for any use or purpose; or that it will not cause injury or damage to persons or property; or that any information (including the analysis, a part of the description, set forth in Article I) furnished, its contamination, or other matters which may concern it is complete or accurate; and the Government shall not be held responsible for any such injury or damage.

The Purchaser assumes all responsibility and liability for the property purchased hereunder.

ARTICLE V - LICENSE REQUIREMENTS

The residues described herein constitute source material, the receipt, possession, use or transfer of which are subject to licensing requirements and regulations promulgated by the Commission pursuant to the Atomic Energy Act of 1954, as amended (42 USC 2011). Accordingly, purchasers must obtain a license and comply with the requirements of the regulations pertaining to source material as set forth in 10 CFR, Parts 20, 40 and 70.

ARTICLE VI - NOTICE TO PROCEED WITH REMOVAL AND TIME FOR REMOVAL

The Government will issue a notice to proceed with respect to removal of residues. In no event shall the Purchaser remove the residues prior to such notice to proceed. The Government will not issue a notice to proceed prior to the Purchaser's obtaining a license as required in Article V above.

After notice to proceed, the Purchaser shall remove the residues within 400 calendar days.

ARTICLE VII - PERFORMANCE BOND

The Purchaser shall be required to furnish a Performance Bond in the amount of $50,000 guaranteeing the removal of all residues.

ARTICLE VIII - PAYMENT

Payment of the purchase price shall be made within 30 days from the date of receipt of notice from the Government to proceed with the removal of the property.

ARTICLE IX - TITLE

Title to the property shall pass to the Purchaser upon payment of the purchase price as provided in Article VIII above and furnishing Performance Bond as required in Article VII above.

ARTICLE X - LOADING AND REMOVAL

As elsewhere provided herein, the property sold hereunder is "as is", "where is" and all loading and removal of the property shall be at the expense of the Purchaser.

ARTICLE XI - ON-SITE PROCESSING

The Purchaser may perform on-site processing operations provided

a. that all processing equipment, and structures installed for the operation, be removed by and at the expense of the Purchaser, promptly at the completion of the work;

b. that tailings resulting from on-site processing of quantities of materials required to be removed in Article II above be removed from the site;

c. that all state, county and local ordnances be complied with;

d. that the Purchaser shall comply with an aerial easement on the property which limits height of any structure on the property to an elevation of 550 feet above mean sea level (about 18 feet above ground level);

e. that any operations on the site shall not interfere with loading C-liner slag on rail cars by the Commission for off-site shipment. This material is located on the east end of the property as shown on MCW Drawing No. 6-1403-19 attached;

f. that the Purchaser shall be responsible and liable for, and shall save the Government harmless from all suits, claims and demands whatsoever kind or nature arising out of or in connection with work performed on the site.

APPENDIX "C"

FORM AEC-2 (3-64) Previous editions are obsolete.

FORM APPROVED BUREAU OF BUDGET NO. 29-R002.

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one)
- ☒ (a) New license
- ☐ (b) Amendment to License No. ____
- ☐ (c) Renewal of License No. ____
- ☐ (d) Previous License No. ____

2. NAME OF APPLICANT
Cotter Corporation

3. PRINCIPAL BUSINESS ADDRESS
Post Office Box 1000, Roswell, New Mexico 88201

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
This source material is presently located at 9200 [illegible], Roswell, New Mexi.

5. BUSINESS OR OCCUPATION
Uranium Mining and Processing.

6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP
Not applicable

(b) AGE

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Cotter Corporation, Canon City, Colorado will process the material to recover uranium.

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (Including % U or Th.)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds)
NATURAL URANIUM	U_3O_8	.3 to 2.0% U	500,000 lbs.
URANIUM DEPLETED IN THE U-235 ISOTOPE	None		
...ORIUM (ISOTOPE)	None		

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)
[illegible] lbs U

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES.

No processing. Material is to be conditioned by drying to 15% moisture content and loaded into rail cars for shipment to Canon City, Colorado.

10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL).

See exhibit "A" item 10

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9: INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument).

See exhibit "A" item 11(a)

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).

See exhibit "A" item 11(b)

11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS. MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

Type of operation will not require any special ventilation equipment.

SCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROEDURES TO THE OPERATIONS LISTED IN ITEM 9: INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

See Exhibit "A" Item 12(a)

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

Not applicable to material or operations involved.

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See Exhibit "A" Item 12(c)

13. WASTE PRODUCTS: *If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here* ☐ *and explain on a supplemental sheet:*

(a) Quantity and type of radioactive waste that will be generated. Not applicable.

(b) Detailed procedures for waste disposal.

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (*Specify instrument used, date of calibration and calibration technique used*) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(This item must be completed by applicant)

15. *The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.*

COTTER CORPORATION
(Applicant named in Item 2)

Dated December 16, 1959

BY: David P. Marcott
(Print or type name under signature)
David P. Marcott
Executive Vice President & General Manager
(Title of certifying official authorized to act on behalf of the applicant)

WARNING: 18 U.S.C. Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U.S. GOVERNMENT PRINTING OFFICE: 1964—O-706-977 817—427—2

EXHIBIT "A"

ITEM 10: Supervisory personnel for drying and loading have had extensive experience in handling material of similar nature from standpoint of prevention of excessive contact with material and prevention of creation of dust. Radiation safety program will be under the direction of E. Edgerley, Jr. of the firm of Rykiman, Edgerley, Burbank and Associates, Inc., Environmental and Sanitary Engineering Consultants. Edgerley is a graduate Environmental and Sanitary Engineer with radiological health minor as part of doctoral program at the University of California, is Associate Professor of Environmental Engineering at Washington University where he teaches courses in engineering aspects of radiological health and has had over twelve years experience as an Environmental Engineer involving various phases of engineering related to radiological safety.

ITEM 11: (c) Each worker will be issued a film badge to be worn at all times while on premises. High volume air samples will be taken at periodic intervals at selected locations to assure lack of dust. Continuous tape air sampling will be conducted during operating periods with sample counting accomplished using a windowless, gas flow, proportional radiation detector. Periodic monitoring in the area of operation will be made with use of a Geiger-Muller detector having a 1.6 mg/sq. cm. end window probe.

ITEM 11: (b) Film badges will be supplied and processed by R. S. Landauer, Jr. and Company of Matteson, Illinois. Radiation detector equipment will be calibrated by use of disc sources.

ITEM 12: (a) Employees engaged in moving of residue material will be required to wear film badges at all times while on premises and all clothing worn on premises will be supplied at time of reporting to work and retained upon completion of work period. All workers will be required to change clothing and thoroughly shower before leaving premises.

ITEM 12: (b) Area will be monitored on a bi-weekly basis using a Geiger-Muller radiation detector. Air samples for radioactive dust will be taken at warranted locations on a bi-weekly basis using a high volume air sampler. A continuous air sampler using a Gilman Tape Air Sampler will be operated in the vicinity of greatest mechanical and physical activity in order to provide continuous two hour histories of air conditions. Six dust collectors consisting of a 360° sticky paper sampler and a dust-fall bucket will be placed in the area surrounding the storage and loading facility to continuously monitor the dust in the environment. These will be changed on a bi-weekly basis.